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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Timothy Stivland et al. Confirmation No.: 4007
Serial No.: 09/178,126 Examiner: A. Lam
Filing Date: October 23, 1998 Group Art Unit: 1641
Docket No.: 1001.1294101 Customer No.: 28075
For: CATHETER HAVING IMPROVED BONDING REGION

TRANSMITTAL SHEET

Mail Stop Appeal Brief - Patents
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P.O. Box 1450
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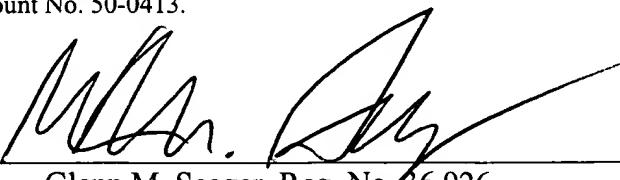
By: 
JoAnn Lindman

We are transmitting herewith the attached:

Appeal Brief Under 37 C.F.R. § 1.192 – in triplicate.
 A check in the amount of \$330.00.
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Please consider this transmittal as a Petition for Extension of Time for a sufficient number of months to enter these papers or any future reply, if necessary. Please charge any deficiencies or credit any overpayment in the enclosed fees to Deposit Account No. 50-0413.

By:


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P A T E N T

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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APPEAL BRIEF UNDER 37 C.F.R. § 1.192

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By JoAnn Lindman
JoAnn Lindman

Dear Sir:

Pursuant to 37 C.F.R. § 1.192, Appellant hereby submits this Appeal Brief in triplicate in furtherance of the Notice of Appeal filed on May 3, 2004. Enclosed herewith is a check in the amount of \$330.00 to cover the fee prescribed by 37 C.F.R. § 1.17(c). Permission is hereby granted to charge or credit deposit account number 50-0413 for any errors in fee calculation.

I. REAL PARTY IN INTEREST

The real party in interest is the assignee of record, SciMed Life Systems, Inc., a corporation organized and existing under and by virtue of the laws of Minnesota, and having a business address of One SciMed Place, Maple Grove, Minnesota 55311. An assignment from

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the inventors Timothy M. Stivland and Elias A. Khoury conveying all right, title and interest in the invention to SciMed Life Systems, Inc. has been recorded at Reel 9724, Frame 0454.

II. RELATED APPEALS AND INTERFERENCES

Neither Appellant, Appellant's legal representatives, nor assignee know of any other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 49-56, 61-64, 67, 69 and 73 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510).

Claims 57, 66, 68, 70 and 74 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116).

Claims 58, 59, 65 and 71 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Javier, Jr. (U.S. Patent No. 6,093,177).

Claims 60 and 72 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Javier, Jr. (U.S. Patent No. 6,093,177) further in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116).

Claims 75-82, 87-90, 93, 95 and 99 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Ressemann et al. (U.S. Patent No. 5,571,087).

Claims 83, 94, 96 and 100 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) further in view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Berg et al. (U.S. Patent No. 5,792,116).

Claims 84, 85, 91 and 97 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No.

5,538,510), further in view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Javier, Jr. (U.S. Patent No. 6,093,177).

Claims 86, 92 and 98 stand finally rejected under 35 U.S.C. § 103(a) as unpatentable over Sirhan et al. (U.S. Patent No. 5,743,875), in view of Ressemann et al. (U.S. Patent No. 5,571,087) further in view of Javier, Jr. (U.S. Patent No. 6,093,177) further in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116).

The Appellant hereby appeals the final rejection of all pending claims 49-100.

IV. STATUS OF AMENDMENTS

All Amendments filed during prosecution of this application appear to have been entered. No After Final Amendment has been filed.

V. SUMMARY OF INVENTION

The present invention is directed to a catheter shaft that includes a first tube and a second tube. The first tube can include an inflation lumen for providing inflation fluid to a balloon while the second tube can in some embodiments function as a distal guide wire lumen suitable for single operator exchange. The first tube can be formed of a highly flexible material while the inside of the second tube can be formed of a highly lubricious material, yet the second tube can be securely bonded to the first tube.

In some embodiments, the second tube can include an inner layer that is highly lubricious and an outer layer that is formed of the same material as that of the first tube. By bonding the outer surface of the second tube to the outer surface of the first tube, a strong, secure bond can be formed. See for example page 3, lines 7-14, page 4, lines 2-4 and page 5, lines 7-9 of the instant specification. See also Figure 2 and the accompanying descriptive text found on page 8, line 10 through page 9, line 12. In Figure 2, an outer surface of outer tube 802 is bonded to an outer surface of inner tube 805 in bonding region 851.

Independent claim 49 recites a catheter shaft that has a first tube and a second tube. The first tube includes an inflation lumen that is in fluid contact with a dilation balloon. The first tube has an inside wall surface, an outside wall surface and a first tube length. The first tube also includes an orifice in a portion of said first tube. The second tube is inserted through the orifice

and extends distally therefrom through the inflation lumen. The second tube has a length, a lumen extending through the second tube, an inside wall surface and an outside wall surface.

The catheter shaft includes a bonding region in which the outside wall surface of the second tube is bonded to the outside wall surface of the first tube by re-flow of the first and second tube outside wall surfaces. The inside wall surface of the second tube is formed of a lubricious material for a majority of the length of the second tube. The first tube has a layer of a flexible material extending for a majority of the first tube length. The flexible material is different from the lubricious material.

Independent claim 75 adds a third tube where the first tube is disposed distal of the third tube. A core wire extends distally from the third tube into the first tube. In both claims 1 and 75, the first tube includes a tube wall having proximal portion, a distal portion, and an intermediate tie-layer portion disposed between said proximal portion and said distal portion where the intermediate tie-layer portion is disposed at an angle relative to said tube wall.

VI. ISSUES

(1) Are claims 49-56, 61-64, 67, 69 and 73 unpatentable over the two references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510)? The fundamental issue upon which this Appeal centers upon the non-obviousness under 35 U.S.C. §103(a) of the claimed invention over the teachings of Sirhan et al. (U.S. Patent No. 5,538,510) and the secondary references. A *prima facie* obviousness rejection requires, in part, that the cited combination discloses each and every claimed element. The Examiner relies upon Sirhan et al. to disclose a catheter shaft having a bonding region in which an outer surface of a second tube is bonded to an outer surface of a first tube. Because Sirhan et al. fail to disclose this claimed relationship, any rejection that relies upon Sirhan et al. fails to meet the requirements for *prima facie* obviousness.

(2) Are claims 57, 66, 68, 70 and 74 unpatentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116)?

(3) Are claims 58, 59, 65 and 71 unpatentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Javier, Jr. (U.S. Patent No. 6,093,177)?

(4) Are claims 60 and 72 unpatentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Javier, Jr. (U.S. Patent No. 6,093,177) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116)?

(5) Are claims 75-82, 87-90, 93, 95 and 99 unpatentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Ressemann et al. (U.S. Patent No. 5,571,087)?

(6) Are claims 83, 94, 96 and 100 unpatentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Berg et al. (U.S. Patent No. 5,792,116)?

(7) Are claims 84, 85, 91 and 97 unpatentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) further in view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Javier, Jr. (U.S. Patent No. 6,093,177)?

(8) Are claims 86, 92 and 98 unpatentable over the five references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Ressemann et al., U.S. Patent No. 5,571,087 further in view of Javier, Jr. (U.S. Patent No. 6,093,177) further in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116)?

VII. GROUPING OF CLAIMS

Pursuant to 37 C.F.R. § 1.192(c)(7), Appellant asserts that claims 49-100 stand or fall together.

VIII. ARGUMENT

Sirhan et al. have been misinterpreted by the Examiner throughout the lengthy prosecution of the subject patent application. During prosecution, the Examiner has repeatedly asserted that Sirhan et al. disclose a catheter shaft having a second tube inserted into an aperture within a first tube *where an outer surface of the second tube is bonded to an outer surface of the first tube*. Appellant will demonstrate herein that the cited reference has been misinterpreted such that every element of the claimed invention is not found in the Examiner's combination of references. Thus, the Examiner has not made a *prima facie* case of unpatentability under 35 U.S.C. §103(a).

The Examiner has cited, most recently in paper no. 33, that column 6, lines 1-3 of Sirhan et al. disclose the claimed relationship in which the outer surface of the second tube is bonded to the outer surface of the first tube. The first cited text is reproduced below:

...distal port 41 and the proximal port 42. A slit 44 is provided in the secured sections of the inner and outer tubular members 33 and 32 respectively and it extends distally...

Sirhan et al. (column 6, lines 1-3).

This cited portion of Sirhan et al. discloses nothing more than that element 33 is an inner tubular member and that element 32 is an outer tubular member. Sirhan et al. does not disclose the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube.

The Examiner has cited, most recently in the Advisory Action mailed April 1, 2004, that column 3, lines 17-23 of Sirhan et al. disclose the claimed relationship in which the outer surface of the second tube is bonded to the outer surface of the first tube.

The cited text is reproduced below:

...tubular member. The bond between the secured inner and outer tubular member need not be continuous. It may be intermittent, so long as a significant portion of the interface between the two members is secured along the length. The inner and outer tubular members may be secured together by heat or laser bonding, adhesive bonding, heat shrinking the outer tube onto the inner tube, or other suitable means.

Sirhan et al. (column 3, lines 17-23)

This cited portion of Sirhan et al. discloses nothing more than that element 33 is an inner tubular member and that element 32 is an outer tubular member. Sirhan et al. does not disclose the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube.

The Examiner has cited, most recently in the Advisory Action mailed April 1, 2004, that column 7, line 59 through column 8, line 16 of Sirhan et al. disclose the claimed relationship in which the outer surface of the second tube is bonded to the outer surface of the first tube. The cited text is reproduced below:

The above described catheters may be made by conventional techniques well known to those skilled in the art. Many suitable techniques are described in the references referred to herein. The small diameter distal sections may be formed by heat shrinking the portion of the outer tubular members which form the distal sections onto the underlying inner tubular members with a mandrel disposed in the space between the inner and outer tubular members so that upon the heat shrinking of the outer tubular member an inflation lumen is formed through the distal sections which is in fluid communication with the lumen in the proximal portion of the catheter body and the interior of the balloon. This bonds the small dimensioned distal section to the inner tubular member. A mandrel may also be inserted into the inner lumen of the inner tubular member to support the latter during the heat shrinking of the outer tubular member thereon to maintain its circularity. Alternate methods may be employed to make the small dimensioned distal section. For example, the small dimensioned distal section 17 may be preformed and then be adhesively bonded to the exterior of the inner tubular member. Multiple lumens similar to the inflation lumen may be formed in the small dimensioned section, such as the top and bottom thereof,

by employing multiple mandrels when heat shrinking the outer tubular member onto the exterior of the inner tubular member.

Sirhan et al. (column 7, line 59 through column 8, line 16)

This cited portion describes nothing more than various techniques for securing an inner tubular member to an outer tubular member. The cited text provides no disclosure or suggestion for bonding the outer surface of the second tube to the outer surface of the first tube.

The Examiner has cited, most recently in the Advisory Action mailed April 1, 2004, that column 5, lines 51-56 of Sirhan et al. disclose the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube. The cited text is reproduced below:

...embodiment shown in FIGS. 1-5 in that the distal section of the catheter shaft 31 includes an outer tubular member 32 which is disposed about an inner tubular member 33 and which in part takes the shape of and is secured to the exterior of the inner tubular member along a length 34 of the distal shaft. An unsecured portion 35 of the outer tubular member...

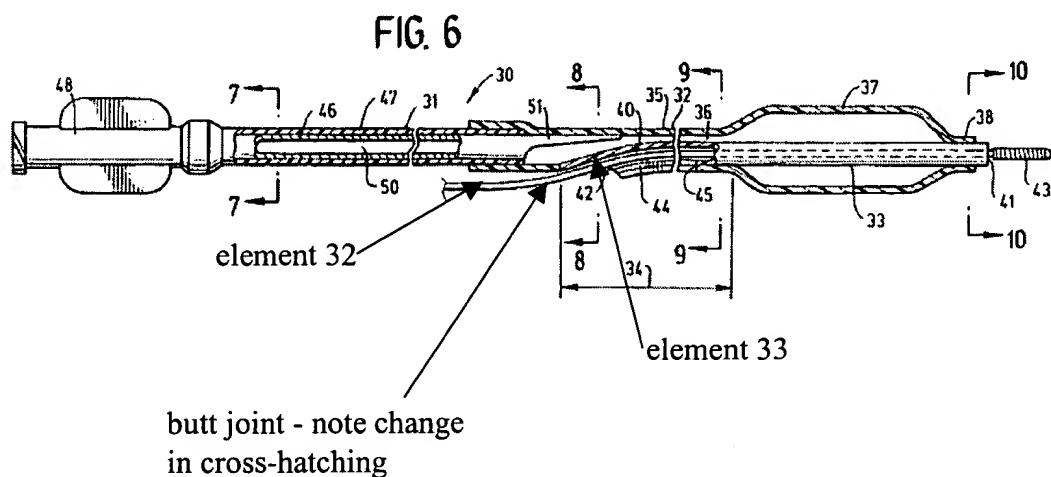
Sirhan et al. (column 5, lines 51-56)

This cited portion of Sirhan et al. discloses nothing more than that element 33 is an inner tubular member, that element 32 is an outer tubular member and that the outer element is secured to the exterior of the inner member. Sirhan et al. does not disclose the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube.

The Examiner has cited, most recently in the Advisory Action mailed April 1, 2004, that Figure 6 shows the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube. Figures 6, 8 and 9 of Sirhan et al. are reproduced below. Figures 8 and 9 are cross-sections of Figure 6 and are taken through length 34 of Figure 6. Figure 8 is a cross-section taken near the proximal end of length 34 while Figure 9 is a cross-section taken near the distal end of length 34. These cross-sectional views clarify Figure 6 and demonstrate that Sirhan et al. fails to disclose the claimed relationship between the first and second tubes.

In particular, element 32 has been asserted by the Examiner to be equivalent to the claimed first tube while element 33 has been asserted to be equivalent to the claimed second tube

that extends through an aperture formed within the first tube. Appellant acknowledges that element 33 does appear to extend through an aperture 42 formed within element 32. However, at no point is an exterior surface of element 33 bonded to an exterior surface of element 32, as required by Appellant's claimed invention. Indeed, as noted at column 5, lines 52-56 of Sirhan et al., element 32 is "disposed about" element 33. This means that element 33 is positioned inside element 32.



As shown above, the proximal end of element 33 meets element 32 in a butt joint. There is no overlap between element 32 and element 33 at the butt joint. That there is a *butt joint* is indicated in part by the change in cross-hatching at the joint. The proximal end of element 33 cannot be considered as having an outer surface that is in contact with an outer surface of element 32.

As indicated below in Figure 8, near the proximal end of length 34 the element 33 enters element 32 through the aperture 42. Element 33 continues in progression until it is entirely within element 32, as shown for example in Figure 9 below. At no point in the progression between Figure 8 and Figure 9 is an outer surface of element 33 positioned proximate to an outer surface 32 such that the outer surface of element 33 could be bonded to the outer surface of element 32. As would be recognized by one of ordinary skill in the art, in Figure 9, element 33 is entirely within element 32 and thus at best an outer surface of element 33 is in close proximity to and could conceivably be bonded to an inner surface of element 32. An inner surface is not

equivalent to an outer surface and thus Figure 6 cannot reasonably be interpreted as describing the claimed relationship between the first tube and the second tube.

FIG. 8

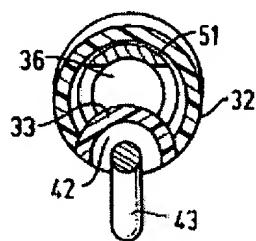
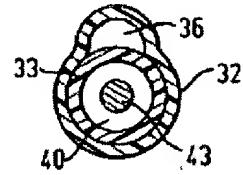
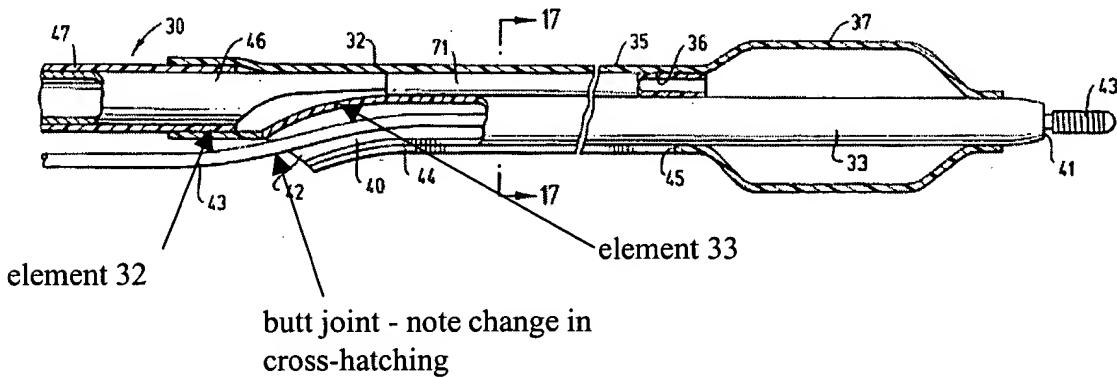


FIG. 9



The Examiner has cited, most recently most recently in the Advisory Action mailed April 1, 2004, that Figure 16 shows the claimed limitation of having the outer surface of the second tube bonded to the outer surface of the first tube. Figures 16 and 17 of Sirhan et al. are reproduced below. Figure 17 is a cross-section of Figure 16. As seen below and as will be discussed in greater detail, Figures 16 and 17 of Sirhan et al. have been misinterpreted by the Examiner.

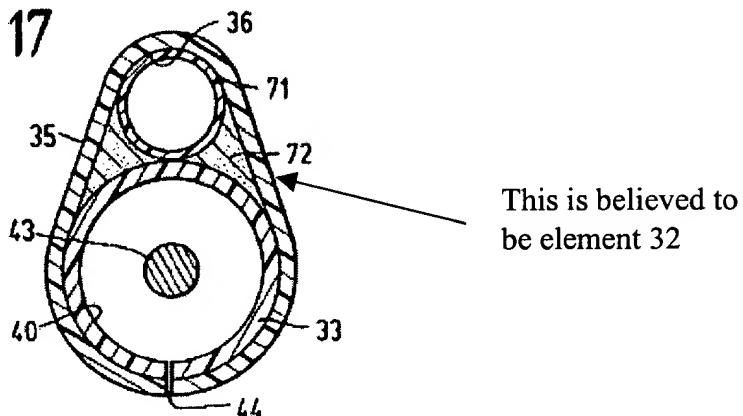
FIG. 16



As seen in Figure 16, the proximal end of element 33 meets element 32 in a butt joint. This is indicated in part by the change in cross-hatching at the joint. The proximal end of element 33 cannot be considered as having an outer surface that is in contact with an outer surface of element 32. Element 33 then progresses into the interior of element 32, as discussed below.

Figure 17 clarifies Figure 16. Element 33 is labeled in Figure 17 below. While element 32 is not labeled in the published Figure, one of ordinary skill in the art will see, based on a review of Figure 16 and the accompanying text in the specification (see for example column 8, lines 31-34 of Sirhan et al.), that element 33 is entirely disposed within element 32. Thus, it is physically impossible for an outer surface of element 33 to be bonded to an outer surface of element 32.

FIG. 17



As noted previously with respect to Figure 6, an inner surface is not equivalent to an outer surface and thus Figures 16 and 17 cannot reasonably be interpreted as describing the claimed relationship between the first tube and the second tube.

Thus, as illustrated herein, Sirhan et al. cannot be considered as describing the claimed relationship between the first tube and the second tube. As Sirhan et al. is relied upon by the Examiner in each and every pending rejection as disclosing this relationship, it would appear that each and every pending rejection is fatally flawed and thus each pending rejection should be withdrawn. Each rejection will be briefly addressed:

(1) Claims 49-56, 61-64, 67, 69 and 73 are patentable over the two references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510). While Fontirroche et al. is relied upon to suggest particular limitations not shown by Sirhan et al., Appellant notes that Fontirroche et al. do not disclose the claimed relationship between the first tube and the second tube and thus Fontirroche et al. fail to remedy the significant shortcoming of Sirhan et al. As a result, the rejection is flawed and should be withdrawn.

(2) Claims 57, 66, 68, 70 and 74 are patentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116). While Berg et al. is relied upon to suggest particular limitations not shown by Sirhan et al. and Fontirroche et al., Appellant notes that Berg et al. do not disclose the claimed relationship between the first tube and the second tube and thus Berg et al. fail to remedy the significant shortcomings of Sirhan et al. and Fontirroche et al. As a result, the rejection is flawed and should be withdrawn.

(3) Claims 58, 59, 65 and 71 are patentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in review of Javier, Jr. (U.S. Patent No. 6,093,177). While Javier, Jr. is relied upon to suggest particular limitations not shown by Sirhan et al. and Fontirroche et al., Appellant notes that Javier, Jr. does not disclose the claimed relationship between the first tube and the second tube and thus Javier, Jr fails to remedy the significant shortcomings of Sirhan et al. and Fontirroche et al. As a result, the rejection is flawed and should be withdrawn.

(4) Claims 60 and 72 are patentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Javier, Jr. (U.S. Patent No. 6,093,177) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116). As noted, none of these references disclose the claimed relationship between the first tube and the second tube. Thus, the rejection is flawed and should be withdrawn.

(5) Claims 75-82, 87-90, 93, 95 and 99 are patentable over the three references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Ressemann et al. (U.S. Patent No. 5,571,087). As Ressemann et al. fails to remedy the noted shortcomings of Sirhan et al. and Fontirroche et al. Consequently, the rejection is flawed and should be withdrawn.

(6) Claims 83, 94, 96 and 100 are patentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) further in view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Berg et al. (U.S. Patent No. 5,792,116). noted, none of these references disclose the claimed relationship between the first tube and the second tube. Thus, the rejection is flawed and should be withdrawn.

(7) Claims 84, 85, 91 and 97 are patentable over the four references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Fontirroche et al. (U.S. Patent No. 5,538,510) further in

view of Ressemann et al. (U.S. Patent No. 5,571,087) and further in view of Javier, Jr. (U.S. Patent No. 6,093,177). As noted, none of these references disclose the claimed relationship between the first tube and the second tube. Thus, the rejection is flawed and should be withdrawn.

(8) Claims 86, 92 and 98 are patentable over the five references Sirhan et al. (U.S. Patent No. 5,743,875) in view of Ressemann et al., U.S. Patent No. 5,571,087 further in view of Javier, Jr. (U.S. Patent No. 6,093,177) further in view of Fontirroche et al. (U.S. Patent No. 5,538,510) and further in view of Berg et al. (U.S. Patent No. 5,792,116). As noted, none of these references disclose the claimed relationship between the first tube and the second tube. Thus, the rejection is flawed and should be withdrawn.

IX. CONCLUSION

For the reasons stated above, the rejection of claims 49-100 under 35 U.S.C. §103(a) should be reversed.

Respectfully submitted,
Timothy M. Stivland et al.
By his attorney,

Date: _____

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X. APPENDIX OF CLAIMS

1-48. (Cancelled)

49. (Previously Amended) A catheter shaft comprising:

a first tube including an inflation lumen in fluid contact with a dilation balloon, an inside wall surface, an outside wall surface, and a first tube length, said first tube having an orifice in a portion of said first tube;

wherein said first tube includes a tube wall having proximal portion, a distal portion, and an intermediate tie-layer portion disposed between said proximal portion and said distal portion, said intermediate tie-layer portion being disposed at an angle relative to said tube wall;

a second tube inserted through, and extending distally from, said orifice inside said inflation lumen, said second tube having a length, a lumen therethrough, a proximal portion, an inside wall surface and an outside wall surface; and

a bonding region wherein said second tube outside wall surface is bonded to said first tube outside wall surface by re-flow of the first and second tube outside wall surfaces, said second tube inside wall surface being formed of a second, lubricious material for a majority of said second tube length, said first tube wall having a layer of a first, flexible material extending for a majority of said first tube length, said first material being different from said second material.

50. (Original) A catheter shaft as recited in claim 48, wherein said bonding region is proximate said orifice.

51. (Original) A catheter shaft as recited in claim 48, wherein said bonding region includes bonding between said first tube inside surface and said second tube outside surface distal of said orifice.

52. (Original) A catheter shaft as recited in claim 48, wherein said second tube inside and outside wall surfaces are formed of said second material.

53. (Original) A catheter shaft as recited in claim 51, wherein said second tube wall is formed of substantially said second material therethrough.

54. (Original) A catheter shaft as recited in claim 52, wherein said first tube inside surface is formed of said second material proximate said bonding region.

55. (Original) A catheter shaft as recited in claim 53, wherein said first tube has said second material disposed over most of said first tube inside surface proximate said bonding region and distal of said bonding region.

56. (Original) A catheter shaft as recited in claim 54, wherein said first tube includes said second material as an inside layer, said first material as an outside layer, and a tie-layer disposed between said inside and outside layers.

57. (Original) A catheter shaft as recited in claim 53, wherein said second tube includes polyethylene, said first tube includes an inside layer of polyethylene, an outside layer of PEBA, and a tie-layer disposed between said inside and outside layers.

58. (Original) A catheter shaft as recited in claim 53, wherein said first tube has said inside surface formed of said second material proximate said bonding region and has said inside surface formed of said first material distal of said bonding region.

59. (Original) A catheter shaft as recited in claim 57, further comprising a transition tie-layer disposed between said first and second materials.

60. (Original) A catheter shaft as recited in claim 58, wherein said second tube includes polyethylene and said first tube includes polyethylene proximate said bonding region and said first tube is formed of PEBA distal of said tie-layer.

61. (Original) A catheter shaft as recited in claim 48, wherein said first tube inside surface includes said first material.

62. (Original) A catheter shaft as recited in claim 60, wherein said first tube inside and outside surfaces are formed of said first material.

63. (Original) A catheter shaft as recited in claim 61, wherein said first tube is formed of said first material proximate said bonding region and distal of said bonding region.

64. (Original) A catheter shaft as recited in claim 62, wherein said second tube has a proximal portion proximate said bonding region having an outside surface formed of said first material.

65. (Original) A catheter shaft as recited in claim 62, wherein said second tube is formed of said first material in said proximal portion and formed of said second material distal of said proximal portion and has a transition tie-layer therebetween.

66. (Original) A catheter shaft as recited in claim 64, wherein said first material includes PEBA and said second material includes polyethylene.

67. (Original) A catheter shaft as recited in claim 62, wherein said second tube is formed of said second material, said second tube proximal portion includes a tie-layer disposed over said second material and an outer layer of said first material disposed over said tie-layer.

68. (Original) A catheter shaft as recited in claim 66, wherein said first material includes PEBA and said second material includes polyethylene.

69. (Original) A catheter shaft as recited in claim 62, wherein said second tube has said inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outside layer formed of said first material disposed over said tie-layer.

70. (Original) A catheter shaft as recited in claim 68, wherein said first material includes PEBA and said second material includes polyethylene.

71. (Original) A catheter shaft as recited in claim 62, wherein said second tube proximal portion is formed of said first material and said second tube distal of said proximal portion is bonded to said proximal portion and has an inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outer layer formed of said second material disposed over said tie-layer.

72. (Original) A catheter shaft as recited in claim 70, wherein said first material includes PEBA and said second material includes polyethylene

73. (Original) A catheter shaft as recited in claim 62, wherein said second tube proximal and distal portions have an inside layer formed of said second material and an outside tie-layer disposed over said inside layer.

74. (Original) A catheter shaft as recited in claim 72, wherein said first material includes PEBA and said second material includes polyethylene, wherein said second tube outside tie-layer wall surface is heat bonded to said first tube inside wall PEBA surface proximate said orifice.

75. (Previously Amended) A catheter shaft comprising:

a first tube including an inflation lumen in fluid contact with a dilation balloon, an inside wall surface, an outside wall surface, and a first tube length, said first tube having an orifice in a portion of said first tube;

wherein said first tube includes a tube wall having proximal portion, a distal portion, and an intermediate tie-layer portion disposed between said proximal portion and said distal portion, said intermediate tie-layer portion being disposed at an angle relative to said tube wall;

a second tube inserted through, and extending distally from, said orifice inside said inflation lumen, said second tube having a length, a lumen therethrough, a proximal portion, an inside wall surface and an outside wall surface;

a bonding region wherein said second tube outside wall surface is bonded to said first tube outside wall surface by re-flow of the first and second tube outside wall surfaces, said

second tube inside wall surface being formed of a second, lubricious material for a majority of said second tube length, said first tube wall having a layer of a first, flexible material extending for a majority of said first tube length, said first material being different from said second material;

 a third tube, the first tube being disposed distal of the third tube; and
 a core wire extending distally from the third tube into the first tube.

76. (Original) A catheter shaft as recited in claim 75, wherein said bonding region is proximate said orifice.

77. (Original) A catheter shaft as recited in claim 75, wherein said bonding region includes bonding between said first tube inside surface and said second tube outside surface distal of said orifice.

78. (Original) A catheter shaft as recited in claim 75, wherein said second tube inside and outside wall surfaces are formed of said second material.

79. (Original) A catheter shaft as recited in claim 78, wherein said second tube wall is formed of substantially said second material therethrough.

80. (Original) A catheter shaft as recited in claim 79, wherein said first tube inside surface is formed of said second material proximate said bonding region.

81. (Original) A catheter shaft as recited in claim 80, wherein said first tube has said second material disposed over most of said first tube inside surface proximate said bonding region and distal of said bonding region.

82. (Original) A catheter shaft as recited in claim 81, wherein said first tube includes said second material as an inside layer, said first material as an outside layer, and a tie-layer disposed between said inside and outside layers.

83. (Original) A catheter shaft as recited in claim 78, wherein said second tube includes polyethylene, said first tube includes an inside layer of polyethylene, an outside layer of PEBA, and a tie-layer disposed between said inside and outside layers.

84. (Original) A catheter shaft as recited in claim 78, wherein said first tube has said inside surface formed of said second material proximate said bonding region and has said inside surface formed of said first material distal of said bonding region.

85. (Original) A catheter shaft as recited in claim 84, further comprising a transition tie-layer disposed between said first and second materials.

86. (Original) A catheter shaft as recited in claim 85, wherein said second tube includes polyethylene and said first tube includes polyethylene proximate said bonding region and said first tube is formed of PEBA distal of said tie-layer.

87. (Original) A catheter shaft as recited in claim 75, wherein said first tube inside surface includes said first material.

88. (Original) A catheter shaft as recited in claim 87, wherein said first tube inside and outside surfaces are formed of said first material.

89. (Original) A catheter shaft as recited in claim 88, wherein said first tube is formed of said first material proximate said bonding region and distal of said bonding region.

90. (Original) A catheter shaft as recited in claim 89, wherein said second tube has a proximal portion proximate said bonding region having an outside surface formed of said first material.

91. (Original) A catheter shaft as recited in claim 89, wherein said second tube is formed of said first material in said proximal portion and formed of said second material distal of said proximal portion and has a transition tie-layer therebetween.

92. (Original) A catheter shaft as recited in claim 91, wherein said first material includes PEBA and said second material includes polyethylene.

93. (Original) A catheter shaft as recited in claim 89, wherein said second tube is formed of said second material, said second tube proximal portion includes a tie-layer disposed over said second material and an outer layer of said first material disposed over said tie-layer.

94. (Original) A catheter shaft as recited in claim 93, wherein said first material includes PEBA and said second material includes polyethylene.

95. (Original) A catheter shaft as recited in claim 89, wherein said second tube has said inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outside layer formed of said first material disposed over said tie-layer.

96. (Original) A catheter shaft as recited in claim 95, wherein said first material includes PEBA and said second material includes polyethylene.

97. (Original) A catheter shaft as recited in claim 89, wherein said second tube proximal portion is formed of said first material and said second tube distal of said proximal portion is bonded to said proximal portion and has an inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outer layer formed of said second material disposed over said tie-layer.

98. (Original) A catheter shaft as recited in claim 97, wherein said first material includes PEBA and said second material includes polyethylene

99. (Original) A catheter shaft as recited in claim 89, wherein said second tube proximal and distal portions have an inside layer formed of said second material and an outside tie-layer disposed over said inside layer.

100. (Original) A catheter shaft as recited in claim 99, wherein said first material includes PEBA and said second material includes polyethylene, wherein said second tube outside tie-layer wall surface is heat bonded to said first tube inside wall PEBA surface proximate said orifice.

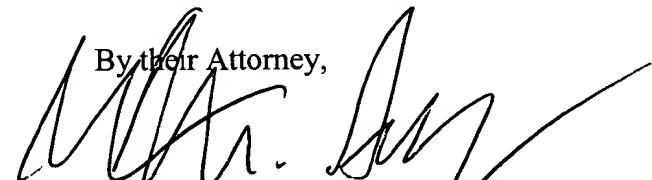
Reexamination and reconsideration are respectfully requested. It is respectfully submitted that the claims are now in condition for allowance, issuance of a Notice of Allowance in due course is requested. If a telephone conference might be of assistance, please contact the undersigned attorney at (612) 677-9050.

Respectfully submitted,

TIMOTHY STIVLAND ET AL.

By their Attorney,

Date: July 1, 2004


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